THE
VETERINARY JOURNAL

Editorial

1938 AND THE PROFESSION

A.D. 1938 draws rapidly to its close, and well may we breathe a sigh of relief. Crisis has followed crisis, and the hearts of the peoples of our great Empire have been stirred more profoundly than at any period since the Great War.

It is good that we experience these shocks and tribulations from time to time for the quietude of peace and plentitude is apt to act as a narcotic, to lead to a complacency, to give a feeling of self-sufficiency and to place a check upon fresh endeavour. The repercussions of international strife have been felt by all. Calls have been made on all for national service. The response to these calls has been magnificent and in no group has this response been better shown than amongst the members of the veterinary profession.

In the midst of this turmoil of anxiety the progress of veterinary science has continued with its usual vigour. Within its own sphere in this country there has been launched a new system of State Service, and steps have been taken to review the veterinary educational system in order to adapt our methods to meet the present and future needs.

April 1 was the zero hour for the new State Service. There were those who viewed the new plan with misgiving, there were many to whom it brought loss both in finance and in status. To some it portended the end of individual effort, to others a victory for bureaucracy. By many it was hailed as a new El Dorado of affluence and prestige. These various views might be considered as extreme and it is fortunate that, as is the case in all democratic countries, neither the fears nor the hopes have been completely fulfilled.

Now that we have had time to consider the scheme in practice we can in truth say that it has been auspiciously launched on an even and relatively fair keel.

The veterinary profession has been given an opportunity to justify its claims to be the only body competent to deal with the problems of animal health and disease. It is our sincere hope that the national service will not fail because of any shortcoming on its part. Success will enhance our influence and prestige; failure may close the door of opportunity for ever.

The second major event of 1938 is concerned with the suggested reorganisation of the system of veterinary education in this country.

The R.C.V.S. is the body directly concerned with this matter. Our

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corporate body is composed of men who can justly claim to represent the views of the profession, for the members of the Council of that College are elected by the free votes of their professional brethren. By tradition and by law we are a self-supporting and self-governing profession. The present high status of the profession is the direct result of the efforts of its governing body and also of its individual members.

The Council of the R.C.V.S. has always been a progressive body and its history shows that it has always worked in the best interests of its members and for the public weal. As new situations have arisen it has adapted its methods to conform with new requirements.

It is reasonable to suppose that the people who are best competent to assess the requirements of a profession are those who are trained in that profession and therefore qualified to voice opinions.

It is a strange fact that when investigations are set on foot by Government departments to inquire into the state of veterinary science there has always been a failure to make use of the services of those who, by virtue of their knowledge and experience, are best qualified to act.

When the Committee on Veterinary Education in Great Britain was appointed in 1936 one would have expected that amongst its members (*and indeed there should be a majority of such men*) would be Council men of the R.C.V.S., the body which is in supreme charge of veterinary education and in whose archives there must be a fund of most valuable information. If one judges from the list of members of this committee one is forced to the opinion that experience in veterinary teaching, practice or government was considered to be of no account.

Is it possible to conceive that a similar committee on medical, legal or any other form of education could be set up which did not include a reasonable majority of members who by their training and experience were competent to assess the value of pertinent evidence and arrive at sound conclusions?

In spite of these disadvantages the committee has published its report. The Report shows that the committee has been diligent in its efforts and generous from the financial aspect. Credit must be given accordingly.

At the present time we do not propose to venture into a detailed analysis of the report for we consider that the body mainly concerned is the Council of the R.C.V.S. We assert again that this body is the only one fully competent to deal with the problems of veterinary education and we will await with interest its views on this most important subject.

There is one point, however, which we feel that we must stress to the utmost, and that is that the veterinary profession will strongly oppose any encroachments upon its rights to follow its own great tradition.

Government of the profession for the profession must be by the profession. It has allowed itself for too long to be dragged at the tail of Agriculture.

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General Articles

TREATMENT OF ABORTUS FEVER

By L. E. W. BEVAN, M.R.C.V.S.
S. Rhodesia.

In the Jubilee Number of "The Journal of Comparative Pathology and Therapeutics," Vol. L, No. 4, December 31, 1937, the writer contributed an article in which he reviewed the history of Abortus Fever in Southern Rhodesia, and recorded a case under treatment with Prosepticine. Unfortunately the hope then expressed that a cure had been expected proved somewhat premature, but as success was finally achieved, some further notes on the case appear desirable.

The subject was a little girl, C.M.B., aged five and a half years, the writer's own daughter. Being under his personal observation, night and day, for over eight months, certain facts were noted which appear to explain many of the uncertainties commonly associated with Abortus infection in the human subject. The source and method of infection were beyond doubt, and the circumstances in which the disease was contracted appear to explain why the infection of human beings in England, where much of the milk contains Br. abortus, are comparatively rare.

Although the history and symptoms of the patient were fully recorded in the original article, it may be well to reiterate certain points which appear to deserve emphasis. First of all, it should be mentioned that there were two children in the family, both of whom ran an equal risk of infection, but only the younger contracted the disease. Both had recently suffered from measles: the one recovered, the other did not. Both received infected milk: one contracted Brucellosis, the other did not. To account for these curious facts it may be well to give in some detail the pre-history of the two children. The elder was born in Coventry, England, in 1930, and came to Rhodesia when six months old. She returned to England in 1932 and in that year her sister, C.M., was born at Chertsey in Surrey. The former undoubtedly received from time to time milk infected with Br. abortus—few children in England can avoid doing so: but the younger child never received raw milk in England, being brought up on "Cow and Gate" dried milk, a food upon which she throve satisfactorily. In April, 1934, both children were brought back to

Rhodesia, and for three years received raw milk from a dairy which for many years had been under the personal observation of the writer as Director of Veterinary Research, and was known by him to be most carefully run and to be free from tuberculosis and contagious abortion. Unfortunately, in April, 1937, the owner of this dairy was compelled by the city by-laws to remove his herd into the country, and thereafter sent all his milk to a Dairy Co-operative Society, handing over his private customers to another dairyman nearer town, who assured them that his herd was equally clean. Nevertheless, the milk from the new dairy was always boiled, until August when the children contracted measles and refused heated milk. Their mother then, in the kindness of her heart, gave them milk unboiled. These apparently insignificant details are recorded at some length as they appear to explain why one child contracted Brucellosis and the other did not. It is suggested that the resistance of both was reduced as the result of the measles, but that the elder child, having frequently imbibed infected milk, had acquired some resistance to Abortus infection, whereas the younger had never had the opportunity of doing so. That the young may derive immunity in this way is shown by the observations of Sven Wald, who demonstrated that calves fed upon the milk of infected mothers derive a resistance to infection with *Br. abortus*, whereas calves fed on milk from non-infected mothers do not do so. In studying the literature on the subject it is found that several of the cases of *Br. abortus* infection have been in children recently recovered from debilitating diseases, such as influenza and whooping cough; and in Rhodesia it has for many years been observed that the usual inhabitants of farms where the cattle suffer from contagious abortion escape infection, whereas visitors to the farm contract abortion disease.

That the child was suffering from Brucellosis was overlooked for three months by the medical man in charge of the case, and was ultimately detected by the writer, who tested her with his "Abortoscope" in November, and immediately obtained a very definite positive reaction. It may be mentioned that the suspension in the Abortoscope was prepared from a bovine strain of *Br. abortus* from the Wellcome Laboratory, Beckenham, England. As soon as this reaction was obtained inquiries were made from the dairyman supplying the milk, who admitted that abortions had recently occurred in his herd; and on a test being made by the Veterinary Research Department, Salisbury, as many as twenty-six positive reactions were detected. It was subsequently found that another child had become infected from the same source. This child also had imbibed the unboiled milk at a time when it was debilitated by a recent attack of measles.

When a correct diagnosis was at last obtained, the question of treatment arose. The writer was assured pontifically that there was no specific medicinal remedy, and was recommended to take the child to England, as change of climate was essential. But as she was too ill to travel this was impossible. In despair, for by that time the patient was in a very critical condition, he

decided to try the effect of the Prontosil group, and selected Prosepticine as being less toxic than Prontosil itself. Although, as pointed out by the Editor of "The Journal of Comparative Pathology and Therapeutics," in a footnote to the original article, the treatment of human patients suffering from Abortus Fever with compounds of the sulphanilamide group had been recorded by Béthoux, Gourdon and Rochedix in the *J. Bul. Soc. Méd. Hôp.*, Paris, November 15, 1937, p. 1,297, the writer commenced treatment with Prosepticine on November 29 before this publication could have reached him. Indeed, no literature on the subject and no medical library was available to him in Rhodesia. The choice of Prosepticine, therefore, was an original and desperate effort on his part, in the absence of any known alternative of value, to ameliorate this distressing disease in his own daughter who at the time appeared to be rapidly "fading away"—a term which correctly expresses her condition.

Although her symptoms were described in the original article, it may be well to recall the most characteristic of them. Following the measles, when she should have been regaining her health, she became lame and complained of pains in the groin, behind the knee and in the ankle. Eventually she became unable to walk or ride her tricycle. She had a little cough which later was found to herald relapses. She became a curious putty colour, and very weak. Soon she was unable even to sit upright. She suffered from inappetence and from most obstinate constipation which yielded only to daily enemas. The temperature was normal or even sub-normal in the mornings, but elevated at midday, remaining high during the latter part of the day. Similarly, in the afternoons and evenings she suffered from severe sweats, her hair and bedclothes becoming "wringing wet." Her breath, fæces and urine had a characteristic "sour" smell. The latter was frequently opaque and *B. coli* infection was suspected, but disproved by laboratory tests. From a rosy-cheeked, healthy little girl she rapidly became a veritable shadow. Her life was only maintained by constant care and attention and by the administration of such foods as she could be persuaded to take. The most valuable of these were small quantities of red meat or meat juice, "Cow and Gate" powder, Avocada pear, orange juice, bread thickly spread with Marmite or Demco. From time to time brandy with glucose or in orange juice appeared to avert a crisis.

With the first doses of Prosepticine, although, as we now know, in absurdly small doses, the temperature was reduced and the symptoms were ameliorated. A total of 5¾ grammes was given in eight days, but during that time the clinical chart records that the patient became brighter, the sweating less, the appetite better, and only twice, after afternoon sleeps, did the temperature reach 102° Fahr. Twelve days after the first exhibition of the drug it was possible to take the child for a short motor drive. Undoubtedly the drug exerted a specific effect, but the Abortoscope still revealed a very marked positive reaction. The day after the motor drive a relapse commenced, but

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this was checked by a few doses of Prosepticine. From time to time until January 7, 1938, similar relapses occurred, during which the child rapidly lost the condition she had gained during the interval. Notwithstanding the good results following small doses of Prosepticine, certain unpleasant symptoms after its administration, such as breathlessness, slight cyanosis, grinding of the teeth and abdominal pains, prevented the parents from risking larger doses. In January, therefore, Dr. W. Blackie, Director of the Public Health Laboratory, Salisbury, kindly agreed to take the case into hospital and treat it with Fonadin, a remedy for which great claims as a curative agent for Malta Fever were then being made. The results, however, were by no means satisfactory. Commencing with a dose of 0.5 c.c. intramusc. and gradually increasing until a maximum of 5 c.c. was reached, a total of 22 c.c. were administered in 17 days. At the end of this course of treatment, however, the patient was definitely more ill than when she entered hospital. The treatment was discontinued, and she returned home. For twenty-six days thereafter her temperature remained elevated, but rarely exceeded 102° Fahr. at midday. She was still weak and from time to time the old symptoms manifested themselves. During this period it was hoped that she might recover sufficiently to be able to bear the long journey to England, but this never became possible.

When the child was in hospital the case had been noted by Dr. Isadore Rosin, of Salisbury, and the results of Prosepticine had been discussed with him. On February 21, 1938, he rang up the writer to tell him that he had obtained a complete cure of the little girl referred to earlier as infected from the same source, by treating her with Sulphonamide-P. He explained that, in his opinion, the cause of the writer's lack of success was the fear of using adequately large doses. He advised that doses up to 1.5 gm. p.d. could safely be given to a child of six years. At the time the patient was suffering from a very acute relapse and the parents, after most serious deliberation, decided to take the risk of the larger doses. The subsequent course of the disease and the doses administered are given in the attached chart, from which certain important observations may be made. In the first place, the administration of the drug was usually followed by an elevation of evening temperature for a few days and thereafter a gradual decline until normal was reached. During this period clinical symptoms ceased and the patient rapidly improved. After an interval of about a fortnight a relapse occurred, but this again responded to treatment. Each relapse was progressively less after a shorter course of treatment, until after the third course no further serious relapses occurred. If at any time a slight evening elevation and any manifestations of symptoms occurred, a single dose appeared to be sufficient to prevent further development. At last, in June, the patient, after two months' freedom from relapse, was well enough to travel and was brought to England to recuperate. Since then she has regained her health and no longer reacts to the agglutination test.

It may be that this record is unduly long and, perhaps, tedious, but it is

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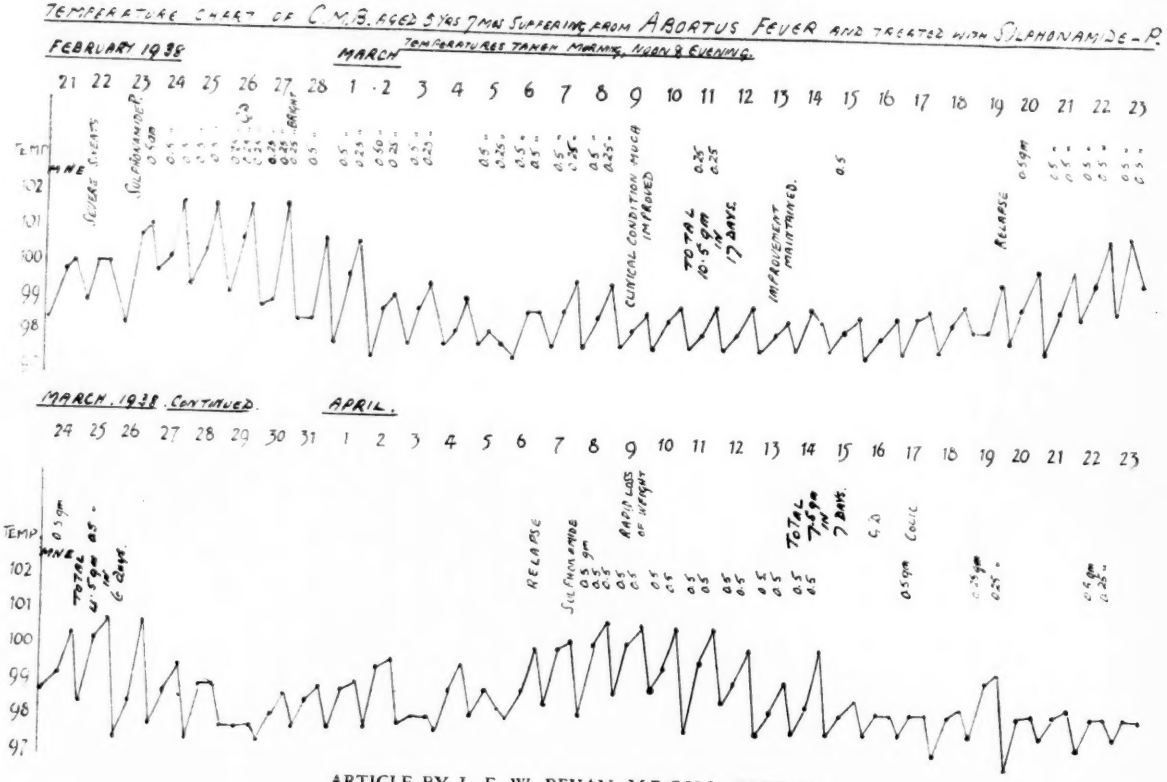
TEMPERATURE CHART OF C.M.B. AGED 5 YRS 7 MN SUFFERING FROM ABORTUS FEVER AND TREATED WITH SULPHONAMIDE-P.
FEBRUARY 1938
MARCH
TEMPERATURES TAKEN MORNG, NOON & EVENING.
21 22 23 24 25 26 27 28 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
TEMP
MNE
SEVERE SYMPTS
SULPHONAMIDE-P
0.5gm
CLINICAL CONDITION MUCH IMPROVED
TOTAL 10.5gm IN 17 DAYS.
IMPROVEMENT MAINTAINED.
RELAPSE
0.5gm
MARCH 1938. CONTINUED.
APRIL.
24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
TEMP
0.5gm
MNE
TOTAL 6.5gm IN 6 DAYS.
RELAPSE
SULPHONAMIDE
0.5gm
RAPID LOSS OF WEIGHT
TOTAL 7.5gm IN 7 DAYS.
C.D
COLIC
0.5gm
0.25

ARTICLE BY L. E. W. BEVAN, M.R.C.V.S., PAGE 441.

believed that certain important facts may be deduced from it which may prove helpful in recognising and treating similar cases.

Summary

1. A case of Abortus Fever in a child of 5½ years of age and the symptoms of the disease are described.
2. The source of infection by *Br. abortus* in milk from a herd suffering from Contagious Abortion is beyond doubt.
3. The correct diagnosis of the disease was determined by the "Aborto-scope" modification of the agglutination test.
4. The subject had not had the opportunity of acquiring any resistance to infection as the result of imbibing sub-infective doses of *Brucella abortus* in milk.
5. Infection was contracted when her resistance was lowered by another disease, i.e., an acute attack of measles.
6. The resistance of the patient's sister exposed to similar risks of infection is significant.
7. The specific effect of Prosepticine and Sulphonamide-P, *vis-à-vis Brucella abortus* in the human subject, are demonstrated.
8. It appears that doses insufficient to effect a cure (that is, a sterilisation of the patient of the Brucella), while ameliorating the symptoms, do not result in the creation of immunity, but rather in the prolongation of sub-acute infection and occasional acute recrudescences.
9. It is only when heroic doses are administered that cure is effected.
10. It is suggested that in human cases with pyrexia of unknown origin, the agglutination test should be immediately and, if necessary, repeatedly applied; and that when *Brucella abortus* infection is demonstrated, the maximum doses of the Sulphonilamide compounds, consistent with safety, should be administered until sterilisation is complete.
11. The necessity for the administration of massive doses to establish active, as against passive, immunity discounts the value of the Prontosil derivatives in contagious abortion and mastitis of cattle.
12. Apology is offered for the intrusion of a veterinarian into the realms of human medicine. The reverse, however, is not uncommon. It serves to indicate the importance of the study of pathology and therapeutics from the comparative outlook.

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CONTROL OF TRICHOMONIASIS IN CATTLE

By W. M. SWANGARD

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Introduction

STERILITY in cattle is one of the basic problems that veterinary medicine is facing to-day in the effort to safeguard agricultural production as an integral part of national economic welfare. The term sterility has become a collective one, in so far as it is applied in reference to any failure in the production of sound offspring. Such failure may be due to a variety of causes, the control of which has become in itself a branch of veterinary science. It is realised that the control of these causes and the recognition of the various factors which come into play in the process of temporary or total sterility is of utmost importance. It is here that often the balance lies between loss and profit to animal industry. To insure the latter, it becomes necessary to apply to the full extent the principles of veterinary science, aided by the great advance in diagnostic skill derived from modern research and teaching.

The purpose of this paper is to present one of the more recent aspects of the problem: the status of knowledge, to date, in regard to the diagnosis and treatment of *Trichomoniasis in cattle*. The writer has had the privilege, during the academic year 1937-38, of taking part in the field work, in this particular problem, with the ambulatoric clinic of the University of Munich Veterinary Faculty under the direction of Professor Abelein. Where no references for statements are given, the writer speaks from his own experiences gained in the field-work done in the province of Upper Bavaria.

Etiology

The first time endometritis and sporadic abortion in cattle were linked up with a protozoic etiology was in 1928 when Riedmueller published a comprehensive paper of his research on the subject.[7] Soon a number of other workers in Germany, and later in America, became interested. It is beyond the limits of this paper to review and to summarise their work. This has been done recently in an excellent paper by H. Schmidt, of Kansas, who also reports that upon careful investigations the disease was recognised as widespread in America.[9] Riedmueller in 1928 named the organism *Trichomonas fœtus*.[8] Now German and American nomenclature gives its species name as *Trichomonas bovis*. It belongs to the division *Protozoa*, class *Mastigophora*, order *Polymastigina*, family *Tetramitidæ*, genus *Trichomonas*.[4]

The body of the organism is almond-shaped, the anterior end rounded,

the posterior end pointed. It measures 10 to 20 microns in length, and 4 to 8 microns in width. It is equipped with three anterior flagella of approximately body length. An undulating membrane protrudes in the manner of a fin from the anterior end, along two-thirds of the body, and has four to six undulations. The marginal filament of this membrane, which can be clearly seen under the high dry power, prolongates from the posterior part of the organism in the form of a free flagellum slightly longer than the anterior ones. Upon closer examination (Giemsa stain and oil immersion) the chromatin ring can be seen, which delineates the shape of the body. From the blepharoblast an axostyle traverses the whole length of the body tapering as it reaches the posterior end, where it emerges as a short process. The nucleus lies near the anterior end above the axostyle and measures three to five microns. Vacuoli of various sizes are distributed throughout the cell. When seen in hanging drop preparation it is actively motile. At intervals the membrane contracts and expands with an accompanying whip-like motion of the posterior flagellum, which propels the organism forward.

The habitat of Trichomonas bovis in the female is anywhere in the genital tract from the commissures of the vulva to the cornua of the uterus, favouring the neighbourhood of the external orifice of the cervix. In the male, the area fortunately is more restricted. Trichomonads in infected bulls may be found in the folds and crevices of the mucous membranes of the prepuce and its adjoining membranes of the penis. Here it may be pointed out that, during the extensive researches carried out at Munich, the organism could not be found in the blood, ureter, vasa deferentia or testes of infected animals, although reports to the contrary had been published.[5] The blood of a great number of infected animals was examined for the presence of trichomonads with negative results. It was then tried to transmit the disease by introduction of the organism into the bloodstream, again with negative results.[3] If careful technique is employed in obtaining the ejaculate from infected males the absence of trichomonads in the ureter and seminal tract may be ascertained. Acute symptoms of the disease, identical to those found in the field cases, have been produced in healthy animals by transfer of pure cultures of the organism on to the mucous membranes of the genital organs. The organism thus is strictly limited in its mode and site of infection. On this fact treatment is based.

Symptoms and Lesions

For convenience of discussion, two sub-headings may be made here:

1. Changes arising indirectly from the presence of the organism.

2. Changes due to *Trichomonas bovis* as the transmissible primary cause.

1. In an instructive experiment Mann[6] at Munich demonstrated *Trichomonas bovis* as a carrier of bacteria. Under aseptic precautions, he filled glass

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tubes with cervical mucous. Within 24 hours trichomonads carrying a known number of *Escherichia coli* had ascended 8 centimetres (3.2 inches) through the mucous seal. In normal circumstances the mucous seal of the cervix (particularly that of pregnant animals) provides an effective barrier to infection. That this defence can be broken by trichomonads was demonstrated subsequently by inoculation of vaginal membranes of pregnant heifers. In every case, after not more than three months, abortion had taken place or pyometra was present with progressing decomposition of the fœtus.[2] In abortive cases trichomonads could be demonstrated and even be obtained in pure culture from the fœtal membranes.[1] In pyometra this is not always possible. After gaining entrance, the intra-uterine distribution of the organism takes place between maternal and fœtal placenta with one of the following results:

(a) The organism carries with it *E. coli* and those soon outnumber the primary invader. The latter disappear and the course of the disease is that of coli-pyometra with persisting corpus luteum.

(b) The organism enters and no secondary invasion ensues, which carries us on to sub-heading 2.

2. Since the transfer of the disease is effected during service, lesions may be caused in male and female organs. The issue, however, is confused by the fact that, in a majority of cases, particularly in those of long standing, observable lesions are entirely absent. The organisms thrive on the mucous membranes of vagina and prepuce. If they increase too much in numbers irritation sets in, the resulting inflammation and the swelling of the lymph follicles presenting the clinical picture.

A fresh infection of a bull results first in inflammation of the prepuce. Within a few days there is a decided swelling and hyperæmic condition of the mucosa. This is followed by a more or less profuse muco-purulent discharge. The animal exhibits pain and often hesitates to serve. At this stage evenly distributed nodules appear on all affected membranes right up to the tip of the penis. These nodules are of millet to lentil size. The acute inflammation usually subsides within a week or two. The colour and condition of the mucosa return to normal, except for the nodules which persist for some time. They lose their deep red colour, first in the centre, and later become quite grey. After several weeks they are detected with difficulty. While trichomonads are easily demonstrable during the acute phase, they are not as easily found later. The animal remains infective.

In the cow the symptoms depend on the age of the animal and the stage of infection of the bull at the time of service. Heifers and young cows are more prone to get the acute form of the disease than older ones. By a bull in the acute stage of the infection, a more acute course of the disease is transmitted. Any of the following conditions may result.

1. Within three days after service, muco-purulent discharge will be ob-

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served from the vulva. Acute vaginitis and vestibulitis with swelling and uterine catarrh ensues. The mucosa of the vestibulum, in its congested condition, and the appearance of nodules is very similar to the analogous state in the bull (Abelein's "rasp" formation). Conception is prevented by uterine catarrh. Soon the acute symptoms subside except for a slight uterine catarrh which persists with occasional watery discharges, which reveal the presence of trichomonads. After several subsequent failures to obtain conception when served, the owner decides to take the animal to another sire when next in heat.

2. Absence of any symptoms recognisable after service. Months later maceration of fœtus and pyometra with persisting corpus luteum is found by rectal examination. The vagina appears absolutely normal. The cervix remains sealed.

3. Total absence of symptoms after service. The cervix, however, opens later, either in periodic spasms or remains open thereafter. Quantities of thin yellow-grey pea soup or egg soup-like purulent discharge are emitted. The discharge may also be clear and watery. The owner is often not worried until he sees the discharge too often or, by chance, a large amount of it.

4. No apparent symptoms occur after service. Conception takes place in spite of infection. After fourteen to thirty days a watery discharge appears immediately followed by abortion. This often happens in the absence of the owner and is never recognised. The œstrus becomes regular again, and after further service a state of repetition ensues closely resembling nymphomania.

In a number of cases where a watery discharge and subsequent abortion takes place, or where the cervix remains closed and the fœtus undergoes maceration, trichomonads in pure culture are obtained. In these case a true metritis does not exist. There is no pus present. The animal seems to show no ill-effects. A state of pregnancy is maintained by the persistence of the yellow body and the trichomonads, having deprived the fœtus of its proper contact and nourishment, continue to thrive in the medium supplied by the carunculæ of the uterus. The writer experienced one case where this state had persisted for twelve months. Evidence of the presence of a fœtus, in this particular case, was a knotty, stringy mass, found after treatment in the aborted fluid.

Diagnosis

It is obvious that, with the variety of symptoms as described above, attention must be given to the general history of a herd. Carefully placed questions as to general fertility, frequency of early abortion or occurrence of vaginal discharge, may yield valuable information. Where suspicion of the presence of the disease is aroused, it is of primary importance to locate the sires of the herd. Their genital organs should be subjected to as close an examination as

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possible without epidural anæsthesia and a properly taken sample of secretion of the prepuce should be examined microscopically, for trichomonads. A catheter for taking aseptically samples of uterine mucus can be used for this purpose to advantage. (H. Hauptner, No. 42951) [10]. If there seems no evidence of organisms in the sample, it must not be concluded that infection is not present. Where anatomical lesions and symptoms are exhibited, these necessarily affirm diagnosis, but in the majority of cases they are absent. Any vaginal discharge warrants microscopic examination and if trichomonads are present the sire of the herd of necessity must be infected, too, if there has been sexual contact. In the diagnosis of this disease, the veterinarian must be sure of his ability to diagnose pregnancy in its earlier stages. To those with some experience, rectal palpation of a two months' pregnancy should not present too much difficulty. Examination per rectum will also reveal pyometra. Vagina and cervix should not be directly palpated before examination per rectum has been finished.

In summing up, it may be said that sporadic abortion, frequent vaginal discharges, pyometra or reports of persistent sterility warrant suspicion of trichomoniasis, although possible differential diagnoses such as brucellosis, uterine catarrh, tuberculosis, infectious vaginal vesiculitis, functional sterility due to ovarian cysts, glandular or anatomical maladjustment must be considered.

Treatment

Breeding operations must be stopped in order to combine curative and preventive treatment. The herd is sorted into: A, non-infected cows and virgin heifers; B, positively pregnant cows; and C, infected cows, those with pyometra or other symptoms of the disease, and the infected sire or sires.

Group A, after careful examination, may be served by a sire which has been declared free of the disease. Group B is kept under observation for potential pyometra cases.

Group C receives curative treatment. In pyometra cases, the treatment begins with enucleation of the corpus luteum. Within forty-eight hours the cervix opens and the purulent content is discharged due to uterine contraction. During the next three or four days the farmer is advised to give ,at least once a day, a thorough vaginal douche of 2 to 5 per cent. solution of sodium perborate. Then 100 cc. of a 1 per cent. solution of iodine in potassium iodide is injected carefully through the cervix. This injection is best done from a 100 cc. pressure syringe to which a uterus catheter has been adapted [10]. The Munich technique is as follows: Introduce the right hand into the rectum and with firm grip fix the cervix nearer the outer orifice. The left then introduces the catheter into the vagina and with gentle pressure the cervical orifice is approached and entered. The syringe is now pumped empty without pushing the catheter through the whole of the cervix. The right hand keeps the

cervix fixed throughout the performance. This technique requires skill, and it is recommended that the novice should not use it, but rather bring back the cervix with Neilsen's [10] forceps for the purpose of introducing the catheter. Two per cent. perborate douches are prescribed for a few more days after the expulsion of the iodine liquid has ceased. In cows in which no uterine involvement is present, a persistent treatment of 2 per cent. perborate douches suffices to clear the infection. When the next œstrus has set in, the animal is examined for the presence of trichomonads, and if negative, allowed to be served at the subsequent œstrus. In an infected herd it is best to treat all non-pregnant cows. In the enucleation of the yellow body by pressure from the rectum, we must reckon with a mortality of 2 per cent. The fact should be impressed upon the farmer that the possible loss of the animal is preferable to harbouring the infection in his herd. The statistical figures give the percentage of success of the iodine treatment after enucleation between seventy and eighty in trichomonas-pyometra (pyometra post partum has a tendency to respond more slowly to treatment). Hot douches or oral medication of abortive drugs as alternative treatment of pyometra have not gained popularity. A report has just reached the writer that subcutaneous injection of 30,000 to 40,000 units of "Provetan" has been used successfully in replacing enucleation [2].

Bulls can be treated and cleared of the infection. It is well, however, before attempting treatment to make sure that the value of the animal warrants the somewhat expensive procedure. Sires, at the end of their career or of declining value for other reasons, are best eliminated via the abbatoir. The procedure of treatment is as follows: if there is enough space available in the barn around the usual stand of the animal, it is best to choose that place, otherwise any shed, or, if weather permits, a place in the open will do, where the animal will not be molested while recovering from the epidural anæsthesia. An excellent and simple casting tackle was constructed by Abelein to bring the animal down upon the chest and haunches. It consists of an adjustable belt eight inches wide with two rings riveted above each other on either side. The upper ring serves as a pulley for the rope from the hind foot, and the lower ring for the rope from the front foot. The animal is anæsthetised and pulled down, and the ropes are secured. When rolled on to its side no further adjustment is necessary. In over two hundred cases not a single instance could be recorded of injury by casting animals weighing from six to over twenty-two hundredweight. For epidural injection, a 2 per cent. tutocaine solution, at body temperature, is employed, 7 cc. per hundredweight of the animal. This will effect complete anæsthesia of the hind quarters, and the necessary relaxation of the retractor penis. With the patient in operating position, the hair at the prepuce opening is shorn, and penis unsheathed. In a number of cases it is necessary to employ suction into a glass tube of corresponding diameter in bringing out the penis. While an assistant firmly holds,

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with a clean cloth, the distal part of the penis, the whole mucosa of the prepuce is exposed by gentle pulling. The operator, using rubber gloves, smoothes out the membranes and systematically, with gentle pressure, thoroughly massages them with 75 to 100 ccm. of a 0.5 per cent. trypaflavin salve. Particular attention is paid to the many folds and crevices, especially near the opening of the ureter. The salve is applied uniformly without rubbing too vigorously, the whole procedure lasting at least ten minutes. A catheter is then introduced into the ureter two to three inches, and 30 cm. of a 0.1 per cent. trypaflavin solution is injected. The penis is now re-sheathed, and the opening of the prepuce well covered with salve and tied with a string to prevent unsheathing. When anæsthesia has completely worn off the string is removed. After a week to ten days the treatment is repeated.

A few additional remarks may be in order to avoid unpleasant incidents. To keep the animal from throwing its head about when cast, and possibly break off a horn, its nose should be firmly held to the ground. After treatment, we made a rule to keep animal restrained for several hours to prevent dangerous attempts of rising before full control of hind limbs was restored. Examination at the second treatment will reveal fibrinous membranes or patches covering the mucosa. These are easily removed, and their formation seems of no serious consequence. Before the owner can be assured that the disease is eliminated, a herd should have three thorough examinations. The second one should take place when enough time has elapsed to diagnose pregnancy in all cows which had been mated up to the time of the first examination. By then the bull would have been treated and a sample is taken of prepuce secretion for microscopical study. The third time should be three to four months after the first visit, to make sure that all treated animals are still free of the organism.

It is well to pay herds a visit quarter annually thereafter for general sterility control, such as advice concerning proper and economical feeding, examination of bulls for healthy sperm, general genital disorders in the herd, Bang and tuberculosis control. The rate of production will convince farmers of the advantage of such visits.

Summary

1. Trichomoniasis in cattle is a sexual disease only transmitted by coitus. The causative organism, *Trichomonas bovis,* does not enter the circulatory system.

2. Symptoms have been described, although diagnosis must rely on history and microscopical examination where the former are absent.

3. Males and females are curable by the treatment described.

The writer wishes to take the opportunity to express his gratitude to Professor Abelein for his unfailing assistance by tutelage and information, and for his personal interest taken in the writer's work while in Germany.

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REFERENCES

(1) Abelein, R. (1934): Die Trichomonadenseuche des Rindes. *Deutsche Tieraertzl. Wochenschrift* XLII, 449.

(2) Abelein, R.: Personal communication.

(3) Abelein, R.: Behandlung *v.* Bullen mit Trichomonaden. Paper given at Vet. Conf., Salzburg, 1.9.38, under publication.

(4) Fiebiger, J. (1936): *Tierische Parasiten,* 3rd edition. Urban und Schwarzenberg, Berlin und. Wien.

(5) Kust, D. (1936): Trichomodaden u. ihre Bekæmphfung. *Deutsche Tieraertzl. Wochenschrift* XLIV, 177.

(6) Mann, R.: Unpublished results.

(7) Riedmueller, L. (1928): Uber die Morphologie . . . Trichomonaden. Zentrbl. f. Bakt. Abt. 1, Orig. Bd. CVIII.

(8) Riedmueller, L. (1930): Trichomoniasis in connection with abortion in cattle. *Jour. State Med.* XXXVIII, 40-47.

(9) Schmidt, H. (1937): Trichomoniasis abortion in cattle. *J.A.V.M.A.,* vol 43, 608.

(10) Hauptner. Berlin brought out instruments according to Abelein's instructions adapted for trichomoniasis and pyometra treatment. Their forceps "4321m" are considered in Germany to be preferable to Neilsen's forceps.

BOVINE MASTITIS*

By Professor F. C. MINETT, D.Sc., M.R.C.V.S.

Director, Research Institute in Animal Pathology, Royal Veterinary College, London.

In this address I shall try to sketch the position regarding bovine mastitis as we know it to-day, my remarks, of course, being directed almost entirely to the agricultural aspect of the problem and leaving untouched those branches of it which concern bacteriology and public health. At the outset, I would express the considered opinion that we know a good deal more about mastitis than we did 10 or 12 years ago, though I would hasten to add that there is much more knowledge still to be gained, especially in respect of the prevention and control of the disease.

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* A Paper read before a meeting of the Farmers' Club on Monday, October 31, 1938.

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Now it will make for clarity if I present the subject under various headings; in doing so, it will be understood that brevity it essential, but certain references have been appended which will enable those specially interested to obtain any further information they may desire.[1 2]

Kinds of Mastitis

It must be realised in the first place that mastitis, though involving a single organ of the body, is not one disease but includes a group of diseases; in other words, inflammatory changes in the udder of the cow may be caused at different times by several different kinds of bacteria. Most important of these from the agricultural standpoint are the streptococci and the micro-organism known as *B. pyogenes,* while the bacillus of tuberculosis is all important to those concerned with the safety of the milk supplies. The conditions under which these bacteria act and the symptoms produced are not always the same. Thus, *B. pyogenes* tends to produce mastitis of a suppurative kind with abscesses which may break through the skin, disease of this sort often being seen in maiden heifers and dry cows. In tuberculous mastitis, a rare condition compared with the other forms, the udder or some part of it undergoes progressive enlargement and induration. In the course of our work at the Research Institute of the Royal Veterinary College we have shown that mastitis in cows may be caused by streptococci of more than one kind and that the symptoms differ correspondingly.

The form of streptococcus mastitis which is by far the most common and which is seen in milking cows follows a course that is essentially chronic, though from time to time the disease may pass through an acute phase. During long periods there may appear to be little or nothing wrong with the udder or the milk, though careful examination is likely to reveal some induration of the udder tissue, either throughout its substance or at certain parts of it. The truth, however, is that during this more or less quiescent period the disease process is destroying more and more of the milk-secreting tissue and the result will be the "light quarter" with which milkers are familiar. In such udders symptoms of acute inflammation are liable to appear from time to time (so-called "garget") and the milk is then definitely changed to a watery fluid containing clots. Speaking generally, natural recovery does not take place, at any rate not before the quarter is largely destroyed. Finally, it should be said that at no time is there any disturbance in the cow's general health.

A form of streptococcus mastitis which is on the whole much less common is an acute one, in which the udder tissue may be rapidly destroyed. The initial symptom in this form is a "ballooning" of one or more quarters, with complete or almost complete failure of the secretion. After a few days, the secretion may partially return or, on the contrary, the quarter may shrivel and remain permanently dry.

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Incidence of Mastitis and Method of Spread

The rest of this address, unless otherwise stated, will be concerned with the ordinary or chronic form of streptococcus mastitis, because, in the aggregate, this kind far outweighs the others in importance. Two reasons for this are its wide prevalence and its contagious nature.

Those who have close experience of mastitis are agreed that its incidence is not to be measured in terms of clinically obvious cases. As mentioned before, streptococcus mastitis follows a chronic and insidious course, but it is now recognised that, even during the quiescent phase, the cow is often excreting several hundred thousand streptococci in every few drops of milk. Such cows are therefore highly infective to their healthy companions and, curious as it may seem, as a rule they are far more dangerous at this time than when they are showing active symptoms. Hence, in order to obtain a true estimate of the prevalence of the disease it is necessary to examine the milk of all the cows in the herd, even though they may appear to be healthy. Work of this sort has been carried out in a number of countries where intensive milk production is practised, with results which are reasonably concordant. It has been found in short that, on the average, not less than 30 per cent. of cows are infected, while in many herds the figure has to be put as high as 50 to 80 per cent.[3] The disease may be present in one or more quarters, the average extent of infection being about two quarters in each animal. In all this work there has been clear evidence that the prevalence rises with age and that among animals in their first lactation the incidence as a rule does not exceed 5 per cent. No relationship has been found between the extent of infection and the class of herd. As to the way in which the disease spreads, it can be taken as certain that this occurs during the course of milking, the streptococci entering by way of the teat canal and being facilitated in their passage by injuries about the teat orifice. It should not be thought, however, that the spread of this form of mastitis takes place rapidly. It seems that quarters have a certain resistance to infection, connected presumably with the anatomical characters of the teat orifice.

So far as our observations have gone, the acute kind of streptococcus mastitis, to which reference has been made above, does not spread by direct contagion and at present the reason for its occurrence is conjectural. As to *B. pyogenes* mastitis, its tendency to occur during the summer months has led to the suggestion that it is carried by flies. Even if this is true, for certain reasons I do not believe that that is the whole explanation.

Importance to Agriculture

In an address which is primarily intended for farmers it is scarcely necessary to emphasise the economic importance of mastitis. The direct losses are caused by lower milk yield — which means increased production costs owing to the need for keeping an excessive number of cows—lessened value of cows and abnormal herd wastage; there is the additional worry as regards

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milk contracts, also the owner is liable to be faced with objections from the distributors as to the quality of the milk supplied.

It is not a simple matter to make a reasonably close assessment of the amount of milk lost through mastitis. As is well known, milk yield is a highly variable factor and is influenced by many things. Between 1929 and 1934, however, in collaboration with another investigator,[4] I obtained some data as to the effect of mastitis on the milk yield in two large tubercle-free herds made up mostly of Friesians and Ayrshires. Actually, the yields from 180 lactations in 139 Ayrshires and 193 lactations in 138 Friesians were examined. In these two herds, some of the animals were infected with the organism of contagious abortion and it was necessary to take this into account in interpreting the results. It was found that mastitis caused a relatively greater milk loss in the Friesians, i.e., in the higher-yielding animals, than in the Ayrshires. Thus, in the latter, the yield—after corrections had been made for age, length of dry period, etc.—was reduced on the average by 10.8 per cent., while among the Friesians in the two herds the percentage loss averaged 16.5 and 19.5. In cows affected with both mastitis and abortion, the yield was still further depressed. Incidentally, it was proved that abortus infection can cause a depression in yield, even though cows do not actually abort. It was, moreover, clear that the loss of milk caused through mastitis is due not to a shortening of the lactation period but to a continuing fall in yield during the period.

If the data obtained in the two herds are of general application—and there is no reason to suppose otherwise—the aggregate loss to the industry must be enormous.

Diagnosis

As stated above, a large proportion of infected cows show no obvious changes in the udder or the milk, so that before one can proceed intelligently with the business of preventing or treating the disease in a herd it is necessary to consider the question of diagnosis. Nowadays, by means of tests applied to the milk, it is possible to pick out infected cows with a high degree of accuracy, and for this purpose one may employ so-called indirect or direct tests. In the former case one aims at detecting changes in the milk which result from multiplication of the streptococci in the udder, while direct tests are intended to reveal the streptococci themselves. Among the indirect tests may be mentioned that in which use is made of brom-cresol-purple, a reagent by which one can estimate the chemical reaction of the milk, since in mastitis the milk is sometimes unusually alkaline. Again, one may test the milk for abnormal solid material, either by straining the milk through a fine sieve (the so-called "strip cup") or by "separating" the milk in a small centrifuge. Although such methods are simple—so simple in fact that some of them can be used in the cowshed—their use, for certain reasons, is limited, and unfor-

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tunately, too, they are not always reliable. On the other hand, those direct tests which involve growing or cultivating the streptococcus from the milk are highly accurate, though, of course, they have the disadvantage that they can only be carried out in a properly equipped laboratory. There is no reason, however, why such a method should not be practised on a large scale, and in this case it would not be unduly expensive.

Prevention and Treatment

This is naturally a matter of the greatest interest to milk producers. So far as the ordinary streptococcus mastitis is concerned, the procedure in outline is simple. It involves, in the first place, an examination of the milk of each cow in order to pick out *all* those that are infected, and when this has been done the healthy cows will always be milked first. Cows which are heavily infected in two or more quarters or which are old and becoming unprofitable will be disposed of at the first opportunity. Apart from these, there is no urgent need to dispose of cows simply because they are classed as infected, and in fact the possibility of treating some of them can be considered. In practice, of course, the procedure of control is not quite so simple and on individual farms special points will no doubt arise on which professional advice should be sought. I must confine myself here to a few details of more general application.

Naturally, attempts at control are likely to give good results only in herds which are self-contained or in which interchange of animals is limited. If female animals have to be bought, purchases should be restricted as far as possible to first-calving heifers, since such animals are nearly always healthy. Older animals, as well as freshly calving cows, should not be admitted to the healthy section of the herd until it is known that they are giving normal milk. In the healthy group it is advisable as an additional safeguard that animals should be milked not only in order of age but also that first-calf heifers should be milked in the order of their calving. It is unnecessary to keep the healthy and infected groups separate at pasture, but in order to avoid mistakes it is better if possible to milk the healthy group in a separate shed or separate wing of the main shed. If a milking machine is used, separate units will be kept for the healthy and for the infected animals. Attention will be paid to the rules of hygiene. Thus milk from infected cows should be drawn into a vessel and mixed with disinfectant before it is poured away. Milkers should be advised to wash their hands and dip them in a chlorinated solution after milking each cow. Udder cloths may also be rinsed in a similar solution. In particular, I would stress the importance of careful and thorough milking and of what may be called the hygiene of the teats, since injuries to the teats have been proved to play an important part in the spread of mastitis. After milking, the teats should be made reasonably dry and once daily a little teat ointment should be applied to keep the skin supple. Attention to such points

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will do much to prevent teat injuries, but should such occur the cow should be kept apart for a few days until healing is well under way. From the same point of view the provision of sufficient floor space is not only humane but wise.

We are still badly in need of more concrete evidence as to the likelihood of success from the measures outlined. In one herd we succeeded in eradicating the disease and in maintaining a group of healthy cows for as long as five years, thus demonstrating — incidentally for the first time — that the ordinary form of streptococcus mastitis is a purely contagious disease and therefore theoretically preventable.[5] In other heavily infected herds of which we have had experience, the incidence of the disease diminished.[6] My present view is that complete eradication is the ideal at which to aim, though I realise that practical requirements may have to be satisfied with something less than this. However, there can be no question that with reasonable care simple control of the milking order will largely improve the position so far as mastitis is concerned; for more complete success therapeutic treatment is advisable as well. Owners must, however, realise this, that the fight against contagious disease is not an affair of a few weeks, or even months, but one which must be intelligently organised and sustained so long as may be necessary. The control of disease in short should not be regarded as something of a nuisance; on the contrary, the sheltering of healthy animals from preventable disease should be looked upon as a necessary routine, second only in importance to that of providing them with sufficient nourishment.

My final remarks are concerned with therapeutic treatment, which has come to the fore very much during the past few years and which, in selected cases, can be said to be very promising. I would make it clear that, in referring to successful treatment, I mean a complete killing or sterilisation of the disease-producing streptococci in the udder—a matter which can only be decided by subsequent laboratory examination of the milk. Nothing short of this can suffice. In order to sterilise the udder in this sense, it has been found that the chemical reagent must be infused through the teat canal and further that simple chemicals are ineffective, partly because in adequate concentration they are too irritating to the tissues. Comparatively recently, however, there has been elaborated a series of complex chemical compounds which are often effective in a strength that can be well tolerated by the udder. Among these may be mentioned the substances which go by the names of "entozon" and "acriflavine," and they can be used either on cows in milk or during the dry period. In the former case, after thoroughly milking out the infected quarter, a dilute solution of the chemical is infused until the quarter is fairly tense and five minutes later as much of it as possible is withdrawn. This process is repeated seven days later. In dry cows the fluid is allowed to remain in the udder for 24 hours and is similarly repeated after seven days. The treatment is only intended for streptococcus mastitis and only for selected cases, viz.,

cases in which the disease process is not so far advanced that much of the udder is already destroyed. Naturally, no form of treatment can be expected to re-establish normal milk production in advanced cases of this kind.

It seems that of the two substances mentioned, acriflavine is to be preferred and that one may expect cures in 60 or 70 per cent. of cases.[7] There is some milk loss during the few days following each infusion, but afterwards the udder regains its full activity. Naturally, treatment of this sort has to be carried out with care and should be in the hands of an experienced veterinarian.

Still more recently there have been introduced into medical practice, and to some extent into veterinary practice, other compounds known as "sulphanilamides," which are remarkably effective against some of the streptococci. These are now being tested against the streptococci of mastitis, but it is too early to say anything definite as to their value in this respect.

REFERENCES

1 Minett, F. C.: *The Farmer's Guide to Agricultural Research in* 1933, pp. 36-41; *Ibid.*, 1934, pp. 42-46; *Ibid.*, 1935, pp. 36-41. Published by The Royal Agricultural Society of England.

2 Stableforth, A. W. (1935): *Journal of the Ministry of Agriculture*, Vol. 41, pp. 945-955. "Mastitis in Dairy Cows and its Control."

3 Minett, F. C. (1934): XII International Veterinary Congress, Vol. 2, pp. 511-527. "Streptococcus Mastitis in Cattle; Bacteriology and Preventive Medicine." Published by the U.S. Government Printing Office, Washington.

4 Minett, F. C., and Martin, W. J. (1936): *Journal of Dairy Research*, Vol. 7, pp. 122-144. "Influence of Mastitis and of *Brucella Abortus* Infection upon the Milk Yield of Cows."

5 Minett, F. C., Stableforth, A. W., and Edwards, S. J. (1933): *Journal of Comparative Pathology and Therapeutics*, Vol. 46, pp. 131-138. "Studies on Bovine Mastitis. VIII. Control of Chronic Streptococcus Mastitis."

6 Stableforth, A. W., Edwards, S. J., and Minett, F. C. (1935): *Journal of Comparative Pathology and Therapeutics*, Vol. 48, pp. 300-315. "Studies on Bovine Mastitis. XI. Further Observations on the Control of Bovine Streptococcus Mastitis."

7 Stableforth, A. W., and Scorgie, N. J. (1938): *Veterinary Record*, Vol. 50, pp. 663-676. "Entozon and Acriflavine in the Treatment of Chronic Contagious Bovine Mastitis."

CROP AND GIZZARD CONTENTS AS AN AID TO THE IDENTIFICATION OF POULTRY

By W. P. BLOUNT, F.R.C.V.S.

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THE following case, recently heard in the Lewes Police Court, may be of interest.

A local poultry farmer on going to open his poultry houses on Saturday

morning, October 8, 1938, found 16 birds missing, and in one house he found six birds' heads and a miscellaneous collection of feathers, whilst nearby on the ground was one of his birds dead. A trail of blood and feathers led to a fence alongside the main road. It appeared, therefore, that on the night in question the farm had been visited by thieves, a number of birds roughly killed and then removed by motor lorry. The police were informed, and the following chain of events relate to this case.

On the Saturday evening, in a public-house in Brighton, a man was found raffling a few poultry. Plain-clothes police from the Detective Department of the Brighton Police were quickly on the scene, and two men concerned were taken into custody, as their explanation as to how they had acquired the birds was not considered satisfactory. They stated they had been bought from an unknown person, and they were therefore merely raffling them in order to make a small profit.

The birds lost from the farm were Sussex crossed with Indian Game, although one pure R.I.R. hen was also missing. Visits were paid to the defendants' houses and feathers were found in the house and in the dustbin, and a bird plucked and ready for the table was also recovered. An explanation by one of the defendants was that the feathers in the dustbin were some which had come out of a cushion, due to his children having played with it too vigorously.

On the same evening a motor engineer from Brighton reported to the police that his car had been used overnight, for he found it in rather an unusual position in his garage that Saturday morning; he found the engine switched on and that the car had been run with the wrong sort of mixture. Further, an examination of the car revealed the presence of a pool of blood and some feathers. Therefore, it was necessary to try to prove whether the two defendants were actually concerned in the theft of the poultry, or whether they were merely receivers of stolen goods. Since the farm was situated in the county of East Sussex, but the defendants and the birds found in their possession were in the County Borough of Brighton, the case was handed over to the East Sussex County Police, and at this stage the Adviser in Poultry-keeping, Mr. O. R. Stevenson, N.D.P., and I were consulted with the object of assisting in this investigation.

We were presented with :—

(1) Feathers from the car.
(2) Feathers from one of the defendants' houses.
(3) Feathers from one of the defendants' dustbins.
(4) The plucked and dressed bird from one of the defendants' houses.
(5) One of the birds offered for sale in the public-house in Brighton, and
(6) The dead bird found on the plaintiff's farm.

Mr. Stevenson's examination of Items (1), (2) and (3) showed that the feathers were consistent with those which would come from Light Sussex

crossed Indian Game birds. The feathers in Items (2) and (3) were fresh, blood-stained, unprocessed, and not such as would be found normally in a pillow or cushion. He also showed that Item (4) was probably the carcase of a R.I.R. hen. The feather stubs were typical of this breed, an ovary was present internally and the breast bone was well calcified.

My own part in the matter consisted of endeavouring to show whether there was any relationship between the bird sold in the public-house (Item No. 5) and that recovered dead from the plaintiff's farm (Item No. 6).

The following was the veterinary report issued.

Veterinary Certificate

This is to certify that I have this day examined the following articles at the request of Superintendent Holloway of the East Sussex Constabulary:—

Item 7—Gizzard and contents from bird labelled Item 5 "Ancell."
Item 8—Gizzard and contents from bird labelled Item 6 "Coote."
Item 9—Crop and contents from Ancell's bird.
Item 10—Crop and contents from Coote's bird.
Item 11—Grain sample from Coote's farm.
Item 12—Turf sample from Coote's farm.

In that the bird labelled "Ancell" is one believed to have been stolen from Littledown Farm, Lewes, and the bird labelled "Coote" was taken direct from this farm, it may be assumed reasonable to contrast the contents of the gizzards and crops of these two birds.

CROP AND CONTENTS

Coote	Ancell
Sample 10	*Sample* 9
(1) Moss—several species, probably of the genus *Hypnum.**	(1) Moss—several species, probably of the genus *Hypnum.*
(2) Snails—three (*Helix*).	(2) Beetle—one small black variety.
(3) Grasses—several fine leaves.	(3) Grasses—several fine leaves.
(4) Mash—some.	(4) Mash—some.
(5) Clover leaves—a few only.	(5) Wheat haulm—isolated head.
(6) Wheat—mixed sample not of good quality containing both broken and whole grains, the majority being whole.	(6) Wheat—a mixed sample containing one or two broken grains only, the remainder being whole.
(7) Maize—mixed sample, all of which was kibbled, containing some red, some white and the majority yellow.	(7) Maize—a mixed sample, nearly all kibbled, containing a few red and white grains, the remainder being the common yellow variety, mostly cracked or kibbled.

* A member of the Horticultural Staff of the East Sussex County Council was of the opinion that the moss was probably of this genus, or one closely allied, and my statement was therefore based on this opinion.

NOTE.—From a consideration of the above data it will be seen that the following items, nine in all, were common to the two crops: moss, fine leaves, mash, wheat, maize, red, white and yellow, whole and kibbled.

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GIZZARD AND CONTENTS

COOTE	ANCELL
Item 8	*Item* 7
(1) Grasses—isolated fine leaves.	(1) Grasses—one or two fine leaves only.
(2) Moss — very small quantity, smaller than that in the crop.	(2) Moss—none.
Grain	*Grain*
Wheat—few whole grains present.	*Wheat*—whole and cracked wheat grains were present.
Maize—13 pieces of kibbled maize and 45 smaller pieces, part digested, were present.	*Maize*—57 cracked and partially digested pieces of maize representing approximately 7 whole grains were present.

GRIT

Type	*No. of pieces*		*No. of pieces*
Black	125	...	29
Sharp flint	99	...	46
Limestone type	21	...	72
Berrystone type	4	...	—
Chocolate type	14	...	26
Round brown quartz ...	3	...	18
White quartz	5	...	8
Limestone flints	2	...	21
White flint	10	...	16
Brown beach	6	...	29
Red stone	4	...	1
Round porous brown type ...	6	...	2
Miscellaneous	71	...	161
	370		429

NOTE.—From a consideration of the above data relative to these two gizzards, it will be seen that the following were common to both: fine grasses, whole wheat, kibbled and part digested maize particles, and 11 varieties of grit.

Item 11

An examination of a sample of grain taken direct from the farm showed:

Wheat.—This was a mixed sample of a rather poor quality including tailings, odd grains only being cracked.

Maize.—This was a mixed sample, mostly kibbled or cracked, and although the majority was the usual orange-yellow type a few red and white maize

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FIG. 1.—Photographic Enlargement of Mark.

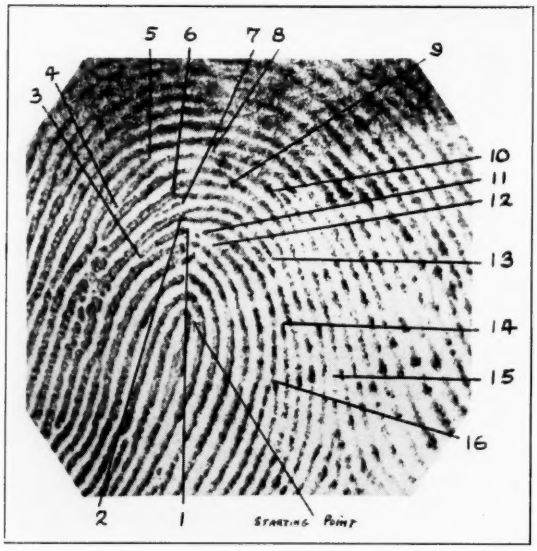
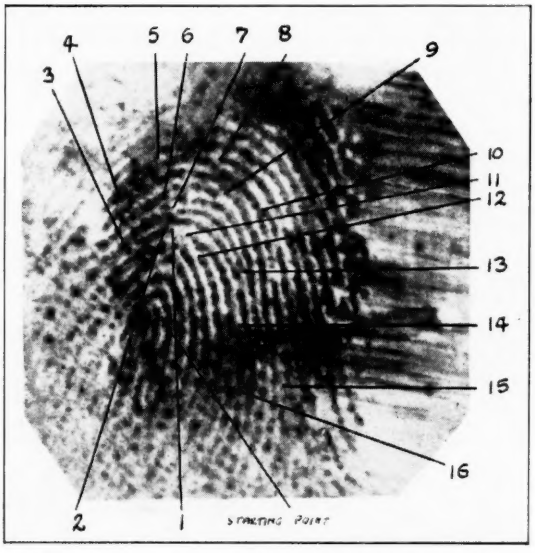


FIG. 2.—Photographic Enlargement of Left Middle Finger.



ARTICLE BY W. P. BLOUNT, F.R.C.V.S., PAGE 459.

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varieties were present. The ratio of red and white maize to the common yellow (orange) was approximately 1 : 18, indicating the predominance of yellow maize. The red and white maize were present in approximately equal proportions.

Weed Seeds.—A few, about 6 per ounce of grain, were present.

Item 12

Sample of turf ex Littledown Farm. The pasture consisted of fine and coarse grasses, a small amount of clover, mosses and weeds.

I am of the opinion that the available data and facts leave no reasonable doubt that the bird labelled "Ancell" (Items 7 and 9) came from the same farm as that labelled "Coote" (Items 8 and 10). It could be argued that the finding of whole and cracked or kibbled grain—maize and/or wheat—together with grasses, clover, beetles and snails could not be considered as satisfactory evidence in that such articles of diet are natural for the hen and would be found, or could be found, in any bird having access to pasture and fed in the normal manner.

However, the finding of moss in the crop is more unusual and from a naked eye examination the sample taken from Ancell's crop does not differ from that found on Littledown farm. The study of mosses is highly specialised and there are few experts in this country, therefore on this point I cannot speak as a specialist, but I would, however, point out that to the naked eye there appears little or no difference between the two specimens.

What is absolutely conclusive concerns the contents of the gizzards. A healthy gizzard will always be found to contain grit, stones or pebbles, which are acquired naturally or fed artificially. Frequently a gizzard will be found to contain three or four varieties, but in the case under discussion twelve varieties were able to be distinguished from each other easily, and eleven of these twelve were common to both gizzards which proves conclusively that Ancell's bird and Coote's bird have been reared together during the past several months.

Another point of confirmation concerns the maize. It is usual to feed ordinary yellow maize; white maize is cheaper but less nutritious and not commonly fed nowadays owing to its deficiency in "Vitamin A," carotene. A sample of maize taken from Coote's farm shows red, white and yellow varieties with the latter markedly predominant. The grains found in the crops and gizzards of Coote's and Ancell's birds also contain red, white and yellow varieties, with the latter markedly predominant.

I confirm, therefore, that in my opinion Ancell's bird came from Littledown Farm, Lewes.

(Signed) W. P. Blount, F.R.C.V.S.

There seemed absolutely no doubt whatever that the bird sold in Brighton and that left on the farm had been reared together and fed together as recently

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as the day before; in other words, that they were both from the plaintiff's farm.

The police, however, were equally successful in their investigations, for an examination of the motor van in Brighton, which the owner stated had been used overnight, revealed a fingerprint on the windscreen. This tallied exactly with one of the fingerprints of one of the defendants and they are reproduced herewith.

In this connection it should be pointed out that the authorities of Scotland Yard do not allow fingerprint experts to go into Court unless 16 points of resemblance regarding ridge characters can be proved. Sixteen such points are indicated in the accompanying photographs. The essential features looked for are ridges which end suddenly, which bifurcate or which form islands, and from a central starting point by counting outwards it will be seen that the bifurcations or other landmarks noted are identical in each photograph. The fingerprint photograph appears clear and the lines widely separated because it is "rolled," whereas the mark was an impression of the finger and as such the lines are closer together and present rather a smudged effect.

It was stated that an expert from Scotland Yard is not allowed to give evidence until he has had at least eight years' experience, and the particular officer in question has been examining fingerprints and nothing but these for the past 16 years, and in no instance has he found any two alike.

The sample of moss was sent to the Curator of the Botanic Gardens, Kew, who identified it as *Camptothecium sericeum Kindb.*, and in his opinion that from the crop and that from the farm were identical.

The case, therefore, was proved conclusively and the defendants received two months' hard labour, and a fine of £3 or one month's imprisonment, respectively.

Review

"Fifty Years a Veterinary Surgeon." By Sir Frederick Hobday, C.M.G., F.R.C.V.S., F.R.S.E. Hutchinson, 10s. 6d.

Without a doubt Sir Frederick Hobday's book, "Fifty Years a Veterinary Surgeon," will be welcomed by veterinarians and animal lovers throughout the country and in many parts of the Empire, as well as abroad.

With his usual brisk style Sir Frederick takes the reader through his extremely full and interesting career as a veterinary surgeon, at the same time as giving some idea of what the veterinary surgeon has done for the health of the nation, and what can be done in the future. It is perhaps typical of the author that in a book covering fifty years of work the opening chapter should be on a subject which is uppermost in his mind at the present time. The chapter is called " Urgency of a liaison between doctor and veterinarian," for as he himself says: " Next, perhaps, to seeing my Alma Mater (The Royal Veterinary College) placed on a footing consistent with its importance in the national life, it is my ambition to see firmly established a liaison between the two branches of medicine, the human and the veterinary." In this chapter he outlines the very urgent reasons for this liaison.

Through the spectacles of Sir Frederick's own career the reader sees the many happenings of the past years in the veterinary and animal world. The book deals with efforts to break the quarantine laws, the fight against glanders, tuberculosis, rabies and mange, the question of intelligence in animals, and many other subjects of interest—but most interesting of all—the magnificent work entailed in the building of the Royal Veterinary College. The story of how this tumbledown old college—through the efforts of Sir Frederick and his willing helpers—was transformed into the splendidly built and equipped College of to-day, is perhaps one of the most enthralling stories of veterinary science. The multifarious methods of raising money themselves are both amusing and interesting—and Sir Frederick Hobday never forgets to mention by name those who helped him in this work.

It is impossible in a short review to cover the whole of the ground of the book, but it suffices to say that with its illustrations, and the foreword by the Earl of Lonsdale, it makes a very important piece of reading and should be on the bookshelf of every veterinarian and animal lover.

Personal

MR. W. P. BLOUNT, F.R.C.V.S.

Our readers will note with pleasure that MR. W. P. BLOUNT, F.R.C.V.S., the Chief Veterinary Officer to the East Sussex County Council, has been awarded the Ph.D. of the Faculty of Medicine, University of Edinburgh, the subject of the Thesis being " The Blood of Ruminants and the Hæmatology of the Domestic Fowl in Health and Disease."

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Publishers' Notices

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